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NORTHERN  
REGION



Our approach to

# SUSTAINING ECOLOGICAL SYSTEMS



**United States  
Department of  
Agriculture**



**National Agricultural Library**



Our approach to

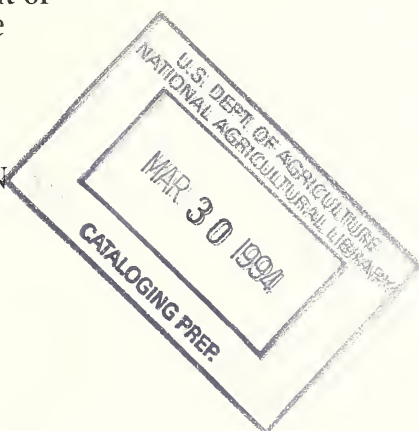
# SUSTAINING ECOLOGICAL SYSTEMS

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United States  
Department of  
Agriculture

Forest  
Service

NORTHERN  
REGION







# SUSTAINING ECOLOGICAL SYSTEMS

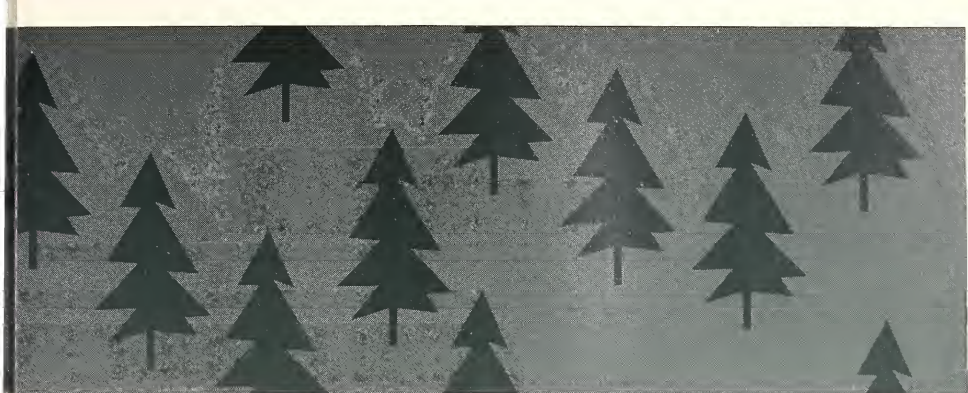


n evolving concept for land  
management in the northern  
Rocky Mountains and plains...

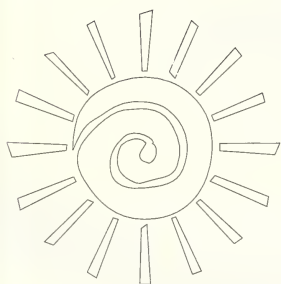
## DEFINITION

*An approach to land  
management that  
places the productivity  
of resource uses or  
values in the context of  
desired conditions for  
the ecological system.*





...in harmony with our need to  
implement, monitor, evaluate  
and adapt our Forest Plans...



## GOALS

- *Balance in*
- *desired resource*
- *uses and values*
- *Environmentally*
- *acceptable*
- *commodity*
- *production*
- *Increased use of*
- *scientific*
- *knowledge in*
- *management of*
- *natural resources*
- *Responsive to*
- *changing values*
- *and needs of*
- *society*





# WHAT IS AN ECOLOGICAL SYSTEM?

**A**n ecological system at any geographic scale is the interdependent relationship of plants, animals, people and the ecological processes that link them with the physical environment of an area.

Natural

► **COMPOSITION**

processes

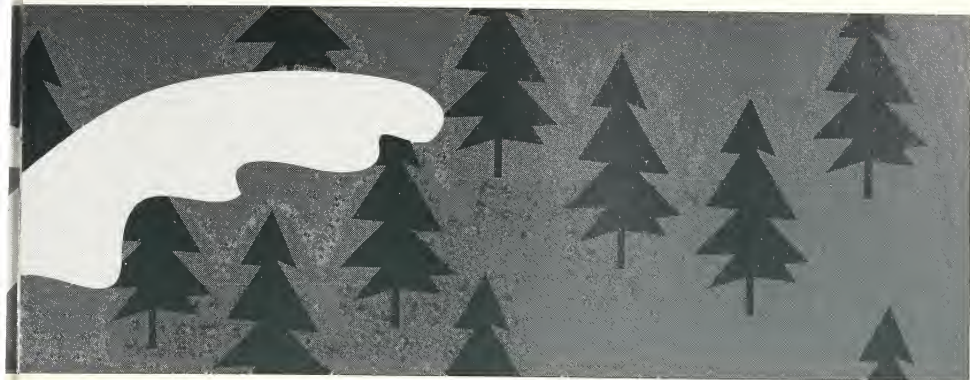
► **STRUCTURE**

and human

influences

► **FUNCTION**





Diversity of elements, e.g. plants and animals, biological communities (habitats), and physical features



Diversity of patterns in the natural elements, e.g., patterns in habitat types within a watershed, snags, canopy layers in a forest



Diversity of ecological processes, e.g., flows of species, materials and energy through landscapes over time; events that cause change in the ecosystem



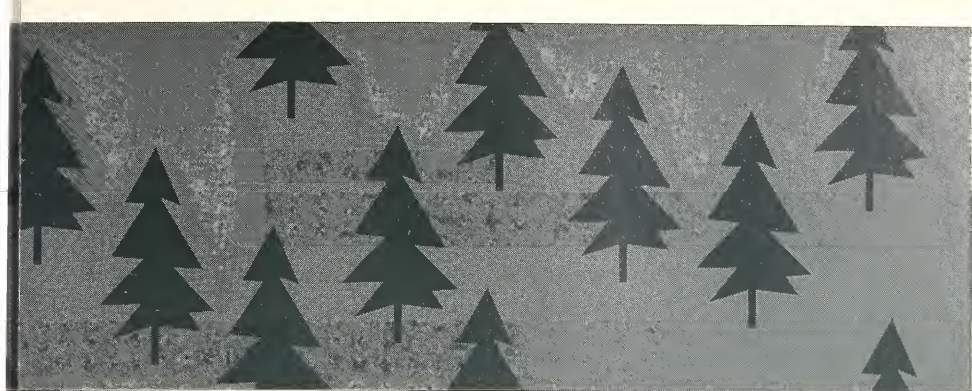
## CONCEPTS

# SPACE

*Ecological systems and their  
biological organization  
should be viewed at different  
spatial scales from a broad  
region to a community or site*



# D



**T**

**IME**

*Ecological system  
management must  
account for change  
and be guided by an  
understanding of  
variability experienced  
naturally over time and  
how change is affected  
by human activities.*

**IVERSITY**

*By protecting and managing the physical,  
cultural and biological diversity of  
ecological systems, their resilience and  
productivity will be maintained, including  
poorly understood and undiscovered plant  
and animal species and ecological processes.*





# SPACE

*Geographic context  
influences what happens  
in sites, stands,  
watersheds and regions.*







WHAT WE DO AT

ANY SCALE WILL

DEPEND ON

WHAT WE KNOW

ABOUT ALL

GEOGRAPHIC


SCALES



# TIME

*Natural processes and human actions over time shape the diversity and productivity of ecological systems.*





# NATURAL VARIABILITY

ECOLOGICAL SYSTEM

MANAGEMENT WILL BE

GUIDED BY AN

UNDERSTANDING OF THE

NATURAL FORCES FOR

CHANGE AND HOW THEY

ARE AFFECTED BY HUMAN

ACTIVITIES.





# DIVERSITY

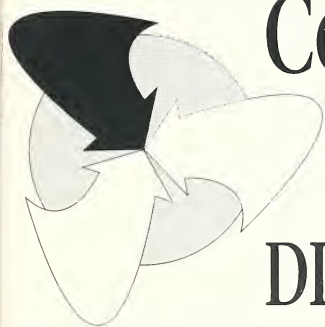
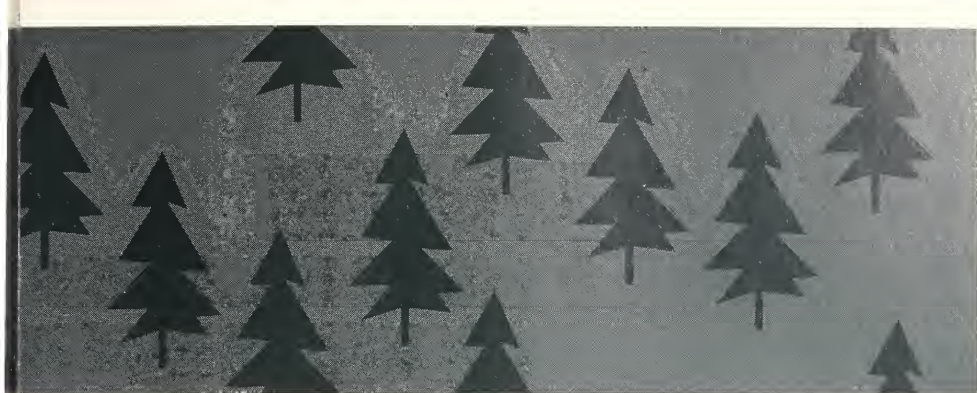
- *Plants, animals or other organisms*
- *Geology*
- *Landforms*
- *Soil*
- *Water*
- *Human cultural diversity*
- *Ecological processes*

TIME

DIVERSITY

SPACE

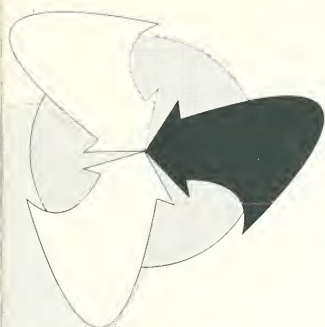




CONSERVING

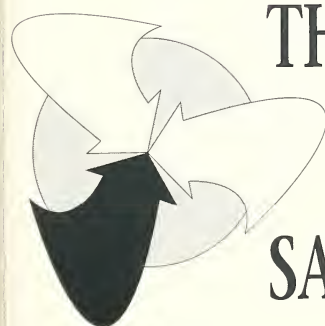
DIVERSITY

IS ESSENTIAL TO



SUSTAINING

ECOLOGICAL SYSTEMS;



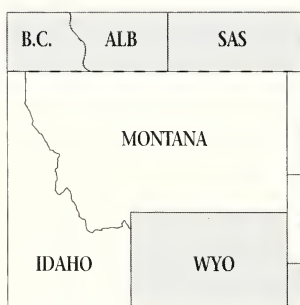
THE FIRST RULE IS TO

SAVE ALL THE PIECES.



A NEW  
PERSPECTIVE...

# PAST



Region



Province



Biogeographic  
Area

TRADITIONALLY, WE HAVE MANAGED TO  
PRODUCE RESOURCES WITH A FOCUS  
PRIMARILY ON SINGLE SPECIES OR RESOURCES  
AT THE STAND OR SITE LEVEL.

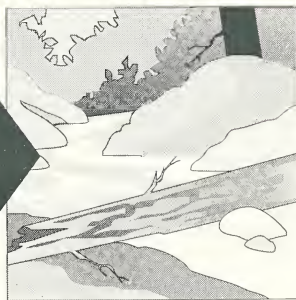


## ...OUR ROLE

ECOLOGICAL SYSTEM MANAGEMENT FOCUSES ON SUSTAINING DESIRED CONDITIONS IN THE DIVERSITY AND PRODUCTIVITY OF THE LAND AT MANY GEOGRAPHIC SCALES, ESPECIALLY THE COMPOSITION, STRUCTURE AND FUNCTION OF ECOLOGICAL SYSTEMS THAT BEST SERVE DESIRED VALUES AND USES.



Site

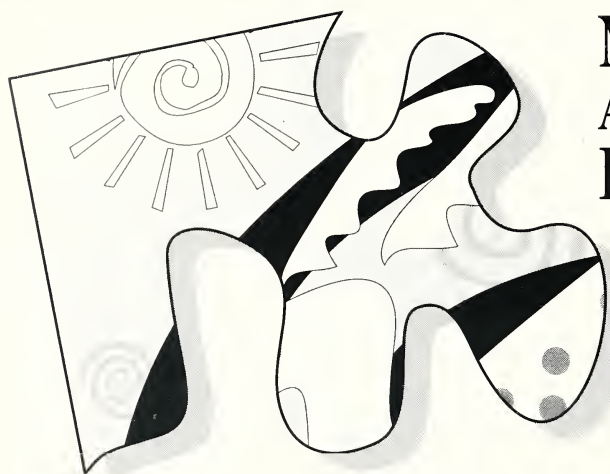


Microsite

# FUTURE



# MAKING THE CHANGE...



## MONITORING AND EVALUATION

**Monitoring and Evaluation**  
*includes broad-scale  
assessments of the  
composition, structure and  
function of ecological  
systems that help determine  
whether Forest  
Plan goals are  
being met or if  
there is a need  
to amend  
Forest Plans.*



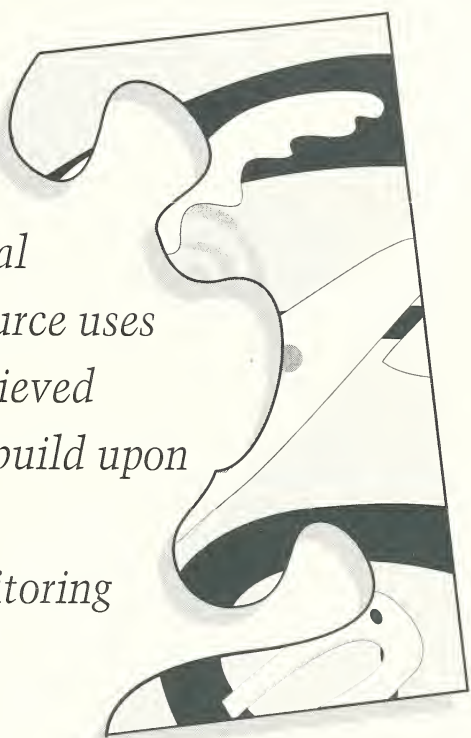
## FOREST PLAN



# ...EXPECTATIONS

*To implement a **Forest Plan**, projects are designed and carried out to achieve the desired future conditions for ecological systems and their resource uses and values. This is achieved through analyses that build upon and refine broad-scale information from monitoring and evaluation.*

## FOREST PLAN IMPLEMENTATION



**Forest Plans** establish the desired future conditions for ecological systems and resource uses and values through goals and objectives, standards and guidelines and management area prescriptions. Analysis of ecological system characteristics, including resource conditions, during monitoring and evaluation and implementation helps determine appropriate plan implementation and revisions.



# MONITORING AND EVALUATION...

**C**onducting both broad-scale and project level analyses is part of the monitoring and evaluation process. In assessing how well Forest Plans are working , monitoring and evaluation provides information that can be used to improve the plan.







# ...EXPECTATIONS

BROAD-SCALE MONITORING AND EVALUATION INCLUDES:

**N***atural ecological system variability over space and time and how it is affected by human influences.*

**N***atural and induced landscape patterns, i.e., fragmentation, biological corridors, forest health and aquatic resources.*

**W***ildlife population viability and conditions of management indicators.*

**C***hanging social and economic demands on National Forests.*

**O***ther broad-scale cumulative effects.*

PROJECT LEVEL ANALYSIS ADDS SITE-SPECIFICITY TO THE BROAD-SCALE ANALYSES AND MAY INCLUDE:

**D***istribution of pre-settlement and existing vegetation in the project area.*

**L***and types, soil families and stream-riparian sites.*

**S***ize, shape, structure and linkage between vegetation.*

**R***are plants, animals and biotic communities, including TES species.*

**H***abitat capability and suitability for plants and animals.*



# FOREST PLAN IMPLEMENTATION...

**F**orest Plan Implementation seeks to achieve desired future conditions based on information gained from monitoring and evaluation, specifically our understanding of variability in ecological systems, existing conditions of ecological systems and how both are affected by human activities.







## ...EXPECTATIONS

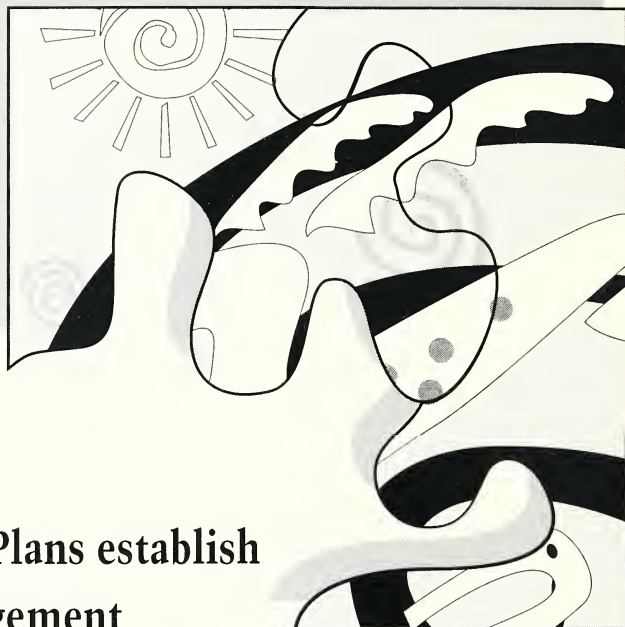
**F***orest Plan Implementation incorporates and refines information on ecological system composition, structure and function at the landscape association, site and micro-site scales.*

**P***roject design incorporates monitoring and evaluation information on broad-scale ecological system characteristics, plus landscape and site-specific information developed in project level analysis.*

**P***roject decisions are based on how well the proposed project alternatives address Forest Plan goals and standards for desired conditions of ecological systems and resource uses and values at all geographic scales.*



# FOREST PLANS...



**F**orest Plans establish management direction to protect environmental values while meeting society's needs for productive, diverse and resilient ecological systems.





## ...EXPECTATIONS

### FOREST PLANS:

**E***stablish forest-wide goals and objectives for broad-scale desired conditions of ecological system composition, structure and function;*

**E***stablish forest-wide standards and guidelines to maintain or achieve desired conditions of specific ecological system characteristics;*

**D***elineate management areas and associated prescriptions that reflect different management emphasis, inherent ecological processes, and natural variability of the area;*

**E***stablish monitoring and evaluation requirements to address key aspects of ecological system composition, structure, function, resource uses and values; and*

**I***dentify research needs to promote increased knowledge and understanding of ecological system composition, structure and function.*





SHARING TO GET  
THE JOB DONE...

...EVERYONE HAS  
A ROLE TO PLAY



PUBLIC  
DISTRICT OFFICE  
REGIONAL OFFICE  
FOREST SUPERVISOR'S OFFICE



## ...EXPECTATIONS

*Integrate the management of ecological systems across all geographic scales.*

*Maintain the biological diversity that sustains conditioning and desired resource uses and values.*

*Sustain short and long-term systems to ensure long-term production of goods, services and values.*

*Integrate biological, physical and social sciences to achieve balance and equity in ecological system management decisions.*

*Meet people's needs for resources in the most environmentally sensitive and economically efficient ways possible.*

*Integrate our evolving scientific knowledge into management plans and projects.*



# GLOSSARY

**Biodiversity:** Variety of life and its ecological processes.

**Biogeographic Area:** A continuous geographic area wherein species composition, both plant and animal, is more homogenous than between adjacent areas.

**Corridor:** An area through which species can move from one place to another over time in response to changes in environment or as natural parts of their life history.

**Ecological Province:** A continuous geographic area in which the ecological systems, produced by climate, topography, biota and soil can be described as meaningfully different than other areas.

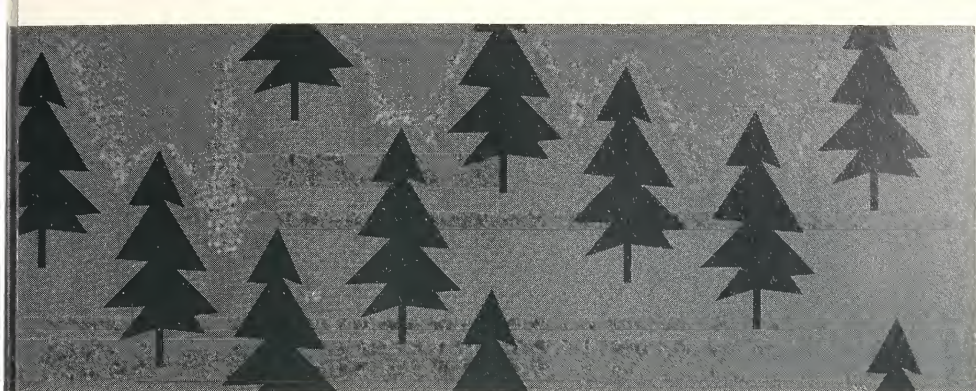
**Linkages:** Characteristics of a landscape that provide direct physical connections between two or more places.

**Microsite:** A rock outcrop, snag, seep, stream pool and other environmental features unique in character but generally too small to map.

**Natural Variability:** Relation between frequency and natural disturbance, e.g., fire, wind and other small to more common large disturbances and the effect on individual plants and animals, communities and ecological systems.

**Site:** An area of land large enough to be mapped, with specific soil characteristics such as water-holding capacity and available nutrients.





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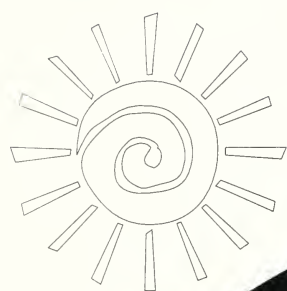






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